REFERENCE 13

Freeman School Wells
Contaminated Ground Water Status Report

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BACKGROUND

Freeman School District is a small rural district located approximately 12 miles south of the City of Spokane Valley, Spokane County, Washington. The elementary, middle and high schools of the district are situated in three separate buildings on one campus. During the school year, September to June, there are approximately 900 students, teachers and staff on campus. The district is completing an extensive expansion and update of school facilities and grounds.

There is currently one six- inch diameter well (WA Department of Health (DOH) S05- Well #5; WA Dept of Ecology Well Tag ID #AHC-757) that supplies drinking, irrigation and fire protection water to the entire campus. A copy of the well log is attached. The School District water supply is classified by the DOH as a Group A, non-transient, non-community (NTNC) water system; DOH Public Water System ID (PWSID) #26460H.

GROUND WATER CONTAMINATION

School Public Water Supply Well

Routine ground water monitoring of the School District well has detected carbon tetrachloride (CCl_4) since 2001 at concentrations ranging from LT.05 ug/L to 7.78 ug/L during April 2008. In March and April 2012 carbon tetrachloride concentrations in the well water were 5.9 ug/L and 7.2 ug/L, respectively. The US EPA MCL for carbon tetrachloride in drinking water is 5.0 ug/L; the Washington State Model Toxics Control Act (MTCA) Method B (carcinogen) Cleanup Level is 0.63 ug/L.

A cursory examination of school well monitoring results indicates higher concentrations of carbon tetrachloride occurred in the spring (March and April), generally corresponding to the typical regional "wet season" and snow melting in the highlands to the east.

The historic occurrence of carbon tetrachloride concentrations in the school well are shown on Table 1.

(b) (6) Well

The (b) (6) well (log attached) is located on a former residential property acquired by the school district for the recent campus expansion program. The (b) (6) house and out-buildings were demolished; however the water well was preserved as a possible supplemental water supply for the school.

During an investigation to determine if the (b) (6) well was a suitable supplemental water supply a ground water sample collected May 30, 2012, following pump test, exhibited a carbon tetrachloride concentration of 48.1 ug/L. The laboratory results are attached (H20 Well Service Inc. letter regarding "Water Analysis: Well Test Results", North Well).

The (b) (6) well is approximately ¼ mile north of the School District well; the (b) (6) well head being about 25 feet higher in elevation. Both wells are shown on Figures 1 and 2. Figure 3 is a photo of the (b) (6) well head.

HYDROGEOLOGY AND GEOLOGY

Not much is known about hydrogeologic character of the Freeman School area. The Freeman area is located in eastern margin of Columbia Basin Aquifer System where the Miocene Columbia River Basalt rocks contact pre-Miocene crystalline rocks of the Rocky Mountains province.

Static water level (SWL) in the (b) (6) well is reported on the well log as 29 feet; no SWL is recorded on the School District well log (log attached). According to the logs both wells are developed in basalt. Low, rolling uplands of crystalline rocks lie immediately east for the subject area. Ground water recharge of the (b) (6) and School wells is assumed to be, in part, supplied from runoff and snow melt from the uplands on the east.

The shallow subsurface geology of the general area is well characterized in USGS Bulletin 1270, *Clay Deposits of Spokane County, Washington,* Hosterman, John W., 1969. In summary, the Freeman School area is overlain by 10-50 feet of aeolian silts and clays of Palouse Formation. A small amount of sedimentary Latah Formation overlies the basalt in vicinity of the School District well. The clay deposits consist of saprolite (highly weathered rock) developed on pre-Miocene crystalline rocks and basalt.

PRELIMINARY CONTAMINANT SOURCE IDENTIFICATION

Introduction

A confirmed source of the carbon tetrachloride contaminating the School District and (b) (6) wells has not been identified. However, there are a number of potential facilities that have been preliminarily identified and assessed as potential sources. The naming of facilities as high,

medium or low potential source is purely speculative. No data or information has yet been found that would indicate carbon tetrachloride has been used, stored or disposed at the named sites.

The preliminary identification and assessment of a site as a high or medium potential source is based upon one or more of the following considerations:

- The association of tetrachloride with a particular industry or process. Historical uses of carbon tetrachloride include metal degreasing, a grain fumigant, a solvent for oils and fats, and a cleaning agent for machinery and electrical equipment.

- A record of, or reasonable opportunity, for improper waste disposal or storage practice. Historically, much ground water contamination has been the result of improper waste disposal and storage. Source sites have included septage lagoons, unregulated industrial and community garbage dumps, and isolated excavations and mines.

- The character of a hypothetical carbon tetrachloride release would be such as to contaminate the regional aquifer. Based upon the properties and environmental fate and transport of carbon tetrachloride, it is speculated that a significant release of the compound is necessary to persistently contaminate ground water. Scenarios include, but are not limited to, a large one-time release or a continuous but smaller release.

Sites assessed as High and Medium potential sources of carbon tetrachloride are designated on Figures 1 and 2. Several of the Low potential sites are also shown.

Sites Judged to be a High Potential Source

- Cenex Harvest States (CHS), Freeman (formerly known as Rockford Grain Growers). Grain storage facility located approximately 250 feet northeast of the (b) (6) well.

Sites Judged to be a Medium Potential Source

- Union Pacific Railroad. Regional main line and a siding located approximately 300 feet east of the (b) (6) well.

- Old Freeman Clay Pit (abandoned). Possibly used for dumping or illegal disposal.

- Freeman School District Facilities. Possible historic use of carbon tetrachloride in welding/metal fabrication and automotive workshops; school bus service/maintenance shop; and, laboratory classrooms.

In addition to the four sites preliminary identified and assessed as high and medium potential sources, several other facilities are situated within Freeman School area that are possible, however unlikely, sources of carbon tetrachloride. Because of the apparent small scale and character of site activities, it is judged that such facilities would not ordinarily use, store or dispose of carbon tetrachloride in such manner and quantity as to contaminate the regional aquifer. These low potential sources include:

- Freeman School District - UST's, petroleum.
- Freeman School District – NPDES to surface water permit.
- Freeman Store - UST associated with a retail service station, petroleum
- Historic brick kiln located south and topographically down gradient of the impacted wells.
- State Highway right-of-way.
- (b) (6) residence, former shops and out-buildings.

RECOMMENDATIONS

Conduct a formal contaminant source identification/assessment study to:

1. Identify and assess potential sources of carbon tetrachloride that has contaminated the Freeman School and (b) (6) wells.
2. Determine the extent and degree of the contaminated ground water.
3. Provide a general characterization of the study area, including hydrogeology, and potentially exposed population.

In general, investigation activities should be those similar to Phase I and II Environmental Site Assessment common to property transfers and to include sampling and analysis of nearby water supply wells.

Sources of information and data used for this report include the following:

- *Correspondence from and conversations with WA Dept of Health staff.*
- *Records on file with the WA Dept of Ecology, Eastern Regional Office, Spokane.*
- *Databases maintained by the WA Dept of Ecology.*
- *Conversations with Freemen School District staff.*
- *A site visit conducted on July 24, 2012*

- *Various publications by the US EPA, USGS and WA Division of Geology and Earth Resources.*

A copy of or reference to these sources may be found in a Toxic Cleanup Program, Initial Investigation file, maintained in the regional office Central Files.

Sample Date	WSID	Lab Sample Nmber	Results Range Catagory	Result*	Units
04/19/2012	26460H	197-71650	EQ	**7.2**	ug/L
03/21/2012	26460H	197-70430	EQ	**5.9**	ug/L
12/7/2011	26460H	197-66670	LT	0.5	ug/L
09/21/2011	26460H	197-63701	LT	0.5	ug/L
06/22/2011	26460H	197-60110	LT	0.5	ug/L
03/31/2011	26460H	197-63141	EQ	3.9	ug/L
10/27/2010	26460H	112-50444	EQ	3.13	ug/L
08/18/2010	26460H	112-45852	EQ	2.22	ug/L
04/28/2010	26460H	112-41307	EQ	4.29	ug/L
11/4/2009	26460H	112-35934	EQ	3.28	ug/L
06/25/2009	26460H	112-29066	EQ	1.8	ug/L
02/26/2009	26460H	112-25489	EQ	1.66	ug/L
11/13/2008	26460H	112-22940	EQ	3.72	ug/L
09/12/2008	26460H	112-20582	EQ	2.14	ug/L
05/20/2008	26460H	112-16075	EQ	2.34	ug/L
04/03/2008	26460H	112-14881	EQ	**7.78**	ug/L
04/30/2007	26460H	125-02895	EQ	2.31	ug/L
05/31/2006	26460H	125-03686	LT	0.5	ug/L
11/16/2004	26460H	112-09775	EQ	1.64	ug/L
08/12/2003	26460H	066-09578	LT	0.5	ug/L
06/20/2002	26460H	066-08163	EQ	1.4	ug/L
07/11/2001	26460H	066-10587	LT	0.5	ug/L
03/22/2001	26460H	066-05163	EQ	0.7	ug/L
01/30/2001	26460H	066-02036	EQ	0.7	ug/L
11/13/1992	26460H	118-00031	LT	0.5	ug/L
05/27/1992	26460H	054-06233	LT	0.5	ug/L

TABLE 1

Carbon Tetrachloride Concentrations

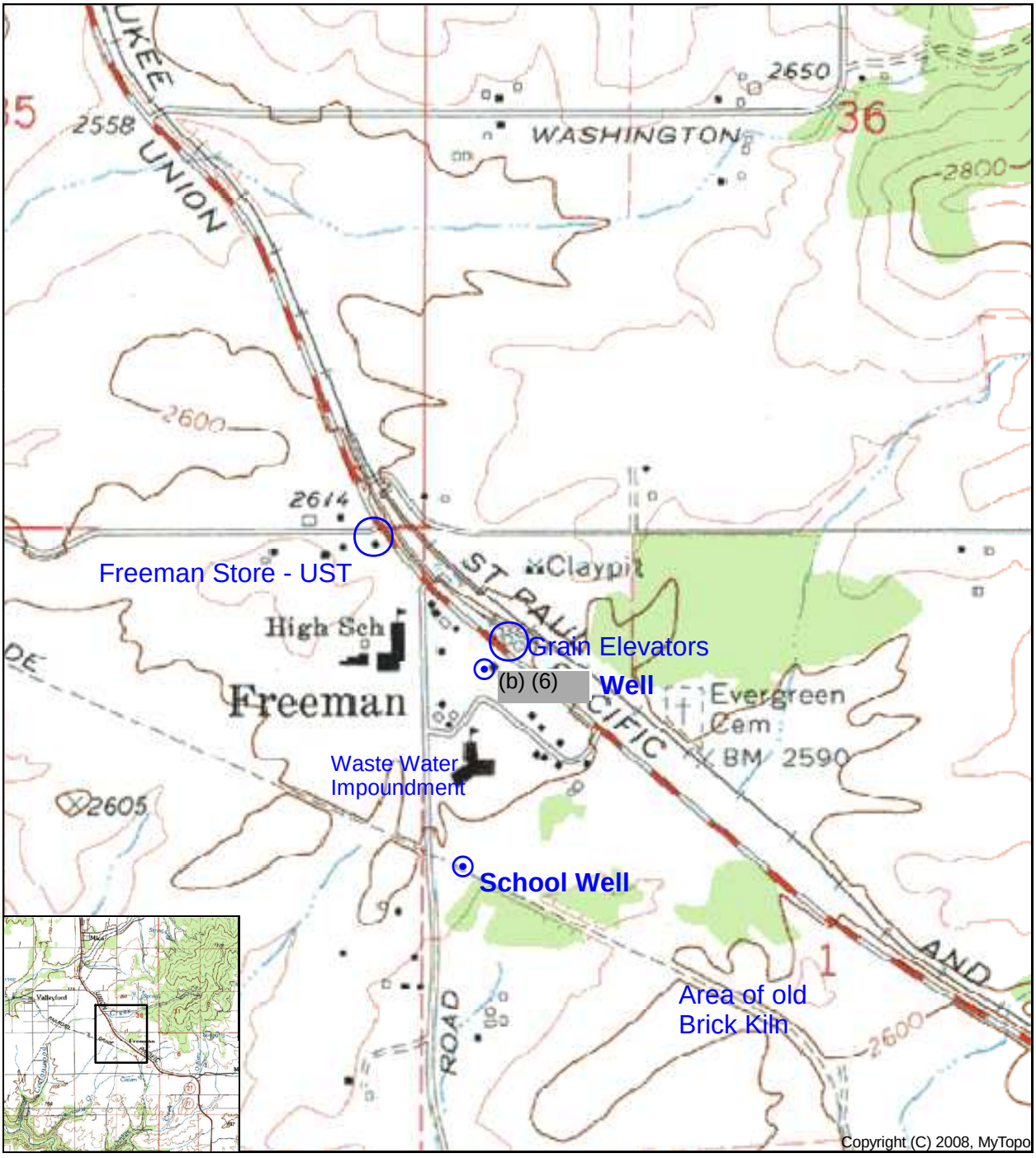
Freeman School District

Drinking Water Supply Well PWSID # 2640H

Ground Water Monitoring Results

Source: Washington Dept of Health, Office of Drinking Water

* The US EPA MCL for carbon tetrachloride in drinking water is 5.0 ug/L; Washington MTCA Method B (carcinogen) Cleanup Level is 0.63 ug/L.



Declination

GN MN

GN 0.14°W
MN 15.32°E

SCALE 1:12000

0 1000 2000 3000
FEET

0.0 0.1 0.2 0.3 0.4 0.5 0.6
MILES

FIGURE 1

Freeman School District
Spokane County, Washington

Site Location Map
Freeman 7.5 ' Topo Quad

Declination

MN

MN 15.32° E

SCALE 1:6000

0 1000

FEET

0.0 0.1 0.2 0.3

MILES

FIGURE 2

Freeman School District
Spokane County, Washington

Site Location Map
Aerial Photo 2003

FIGURE 3

(b) (6) Well
Freeman School District
Spokane County, WA

Looking northeasterly at Cenex Freeman Grain Elevators
7/18/2012